

CLAIMS

1. A honeycomb structural body obtained by assembling one or plural pillar-shaped porous ceramic members, each being made by arranging a plurality of through-holes side by side in a longitudinal direction through partitions and plugging either one ends of these through-holes, characterized in that an opening area at one end face of the honeycomb structural body is different from an opening area at the other end face thereof, and the ceramic member is made of silicon-ceramic composite material consisting of ceramic and silicon.

2. A honeycomb structural body according to claim 1, wherein the honeycomb structural body is constructed by having a group of large volume through-holes plugged so as to make relatively large a sum of opening areas at one end surfaces in a section perpendicular to the longitudinal direction, and a group of small volume through-holes plugged so as to make relatively small a sum of opening areas at one end small in the other section.

3. A honeycomb structural body obtained by assembling one or plural pillar-shaped porous ceramic members, each being made by arranging a plurality of through-holes for the formation of cells side by side in a longitudinal direction through partitions and plugging either one end of these through-holes, characterized in that the porous ceramic member is made by combining a group of large volume through-holes plugged so as to make relatively large a sum of opening areas at one end surfaces in a section perpendicular to the longitudinal direction, and a group of small volume through-holes plugged so as to make relatively small a sum of opening areas at one end small in the other section, and the ceramic member is made of silicon-ceramic composite material consisting of ceramic and silicon.

4. A honeycomb structural body according to claim 3, wherein the porous ceramic member has a relation that a

distance between gravity centers of the large volume through-holes in the section perpendicular to the longitudinal direction is equal to a distance between gravity centers of the small volume through-holes in the section perpendicular to the longitudinal direction.

5. A honeycomb structural body according to claim 3 or 4, wherein the large volume through-hole is made of through-holes having a hole size larger than that of the small volume through-hole.

6. A honeycomb structural body according to claim 3 or 4, wherein the large volume through-hole constitutes a gas inflow side cell opened at an inlet side, and the small volume through-hole constitutes a gas outflow side cell opened at an outlet side.

7. A honeycomb structural body according to claim 3 or 4, wherein the porous ceramic member has a porosity of 30-80%.

8. A honeycomb structural body according to claim 3 or 4, wherein a surface roughness of the partition in the porous ceramic member is 1.0-30.0 μm .

9. A honeycomb structural body according to claim 3 or 4, wherein a thickness of the partition in the porous ceramic member is 0.15-0.45 mm.

10. A honeycomb structural body according to claim 3 or 4, wherein a half-width value of Si peak (2θ = about 28°) in an X-ray diffraction of the silicon-ceramic composite material is not more than 0.6° .

11. A honeycomb structural body according to claim 3 or 4, wherein the through-holes comprise two kinds of through-holes constituting a group of large volume through-holes plugged at one end portions with a plugging material and a group of small volume through-holes plugged at the other end portions with a plugging material.

12. A honeycomb structural body according to claim 3 or 4, wherein the through-hole is polygonal.

13. A honeycomb structural body according to claim 3

or 4, wherein a sectional shape of the through-hole is square and octagonal.

14. A honeycomb structural body according to claim 3 or 4, wherein a corner part of the section of the through-hole is round or chamfered form.

15. A honeycomb structural body according to claim 3 or 4, wherein an area ratio of section of the large volume through-hole perpendicular to the longitudinal direction to section of the small volume through-hole perpendicular to the longitudinal direction (large volume through-hole sectional area/small volume through-hole sectional area) is 1.01-9.00.

16. A honeycomb structural body according to claim 3 or 4, wherein an area ratio of section of the large volume through-hole perpendicular to the longitudinal direction to section of the small volume through-hole perpendicular to the longitudinal direction (large volume through-hole sectional area/small volume through-hole sectional area) is 1.01-6.00.

17. A honeycomb structural body according to claim 3, wherein the partition is provided on at least a part of a surface thereof with a coating layer of a catalyst.

18. A honeycomb structural body according to claim 3, wherein the honeycomb structural body of claim 1 is constructed by bundling a plurality of the porous ceramic members through the sealing material layer.

19. A honeycomb structural body according to claim 3, wherein the ceramic porous member includes silicon carbide.

20. A honeycomb structural body according to claim 3, which uses as a filter for purifying an exhaust gas including particular substance from a vehicle.